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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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FOLEY AND LARDNER LLP
SUITE 500
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WASHINGTON, DC 20007

EXAMINER

PILKINGTON, JAMES

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3656

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/567,139	Applicant(s) MARTIN ET AL.	
	Examiner JAMES PILKINGTON	Art Unit 3656	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 30 December 2010.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-3, 10, 12-18 and 24 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-3, 10, 12-18 and 24 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 06 February 2006 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>9/3/10 and 12/30/10</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on December 30, 2010 has been entered.

Claim Objections

Claim 18 is objected to because of the following informalities: Line 19 "(ID)" should be - (D) -. Appropriate correction is required.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claim 24 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 24 recites the limitation "the oxygen-containing organic compound..." in line 12. There is insufficient antecedent basis for this limitation in the claim.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1, 2, 10 and 12-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Pope, USP 6,655,845 in view of Rubin, USP 5,064,547.

Pope discloses a low-friction sliding mechanism wherein:

- the DLC coated sliding member (races in Figures 2H-1, 2H-2 and 2K-1) is formed by coating diamond-like carbon on a base material (polycrystalline diamond, PDC);
- the sliding member (roller in Figure 2K-1) is formed with at least one kind of material selected from a group consisting of a metal material, a non-metal material and a coated material obtained by coating a thin film on a surface of the metal material or the non-metal material (roller is coated with PDC, clm 2)

Pope does not disclose the use of a low-friction agent composition that contains at least one kind selected from a group consisting of an oxygen-containing organic compound (C) between the two sliding members, wherein the oxygen-containing organic compound is at least one kind selected from a group consisting of alcohols, esters, ethers, ketones, aldehydes, carbonates and derivatives thereof and is contained in the range of 0.05 to 3.0% relative to the total mass amount of low-friction agent composition.

Rubin teaches a low-friction agent composition (lubricant) that contains an oxygen-containing organic compound which is a ester or alcohol (Rubin discloses in column 7, lines 13-26 that esters and alcohols can be used in addition to carboxylic acid) and is contained in a range of 0.05 to 3.0% by mass (weight, column 4 lines 50-59) for the purpose of providing a lubricant with corrosion inhibiting properties (column 5 lines 66-68).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Pope and provide a low-friction agent composition that contains an oxygen-containing organic compound of carboxylic acid in a range of 0.05-3% of the total mass amount of low-friction agent composition, as taught by Rubin, for the purpose of providing a lubricant with corrosion inhibiting properties.

Regarding claim 10, Pope in view of Rubin discloses all of the structural components as recited above, therefore structure has been supplied and formed. Claim 10 does not provided any particular method steps that would differentiate over the prior art.

Claims 3 and 16-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Pope, USP 6,655,845 in view of Rubin, USP 5,064,547 and further in view of Veerasamy, USP 7,067,175.

Regarding claim 3, Pope discloses all of the claimed subject matter as applied to claim 1 above.

Pope does not disclose that the DLC has a hydrogen content of 20 percent or less, in particular an a-C diamond like carbon with no hydrogen.

Veerasamy teaches a DLC which is an a-C diamond like carbon (ta-C) which does not contain hydrogen (column 8 lines 35-36) for the purpose of repelling water and reducing corrosion (column 1 lines 15-21).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Pope and provide for the DLC to have a hydrogen content of 20 percent or less, in particular an a-C diamond like carbon with no hydrogen, as taught by Veerasamy, for the purpose of repelling water and reducing corrosion.

Regarding claims 16-18, Pope discloses a low-friction sliding mechanism wherein:

- the DLC coated sliding member (races in Figures 2H-1, 2H-2 and 2K-1) is formed by coating diamond-like carbon on a base material (polycrystalline diamond, PDC);
- the sliding member (roller in Figure 2K-1) is formed with at least one kind of material selected from a group consisting of a metal material, a non-metal material and a coated material obtained by coating a thin film on a surface of the metal material or the non-metal material (roller is coated with PDC (clm 2))

Pope does not disclose the use of a low-friction agent composition that contains at least one kind selected from a group consisting of an oxygen-containing organic compound (C) and between the two sliding members, wherein the oxygen-containing organic compound is at least one kind selected from a group consisting of alcohols, esters, ethers, ketones, aldehydes, carbonates and derivatives thereof and is contained in the range of 0.05 to 3.0% relative to the total mass amount of low-friction agent composition.

Rubin teaches a low-friction agent composition (lubricant) that contains an oxygen-containing organic compound which is a ester or alcohol (Rubin discloses in column 7, lines 13-26 that esters and alcohols can be used in addition to carboxylic acid) and is contained in a range of 0.05 to 3.0% by mass (weight, column 4 lines 50-59) for the purpose of providing a lubricant with corrosion inhibiting properties (column 5 lines 66-68).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Pope and provide a low-friction agent composition that contains an oxygen-containing organic compound of carboxylic acid in a range of 0.05-3% of the total mass amount of low-friction agent composition, as taught by Rubin, for the purpose of providing a lubricant with corrosion inhibiting properties.

Pope does not disclose that the DLC has a hydrogen content of 10 percent or less or 0.5 percent or less, in particular an a-C diamond like carbon with no hydrogen.

Veerasamy teaches a DLC which is an a-C diamond like carbon (ta-C) which does not contain hydrogen (C8/L35-36) for the purpose of repelling water and reducing corrosion (C1/L15-21).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Pope and provide for the DLC to have a hydrogen content of 10 percent or less, in particular an a-C diamond like carbon with no hydrogen, as taught by Veerasamy, for the purpose of repelling water and reducing corrosion.

Claims 24 is rejected under 35 U.S.C. 103(a) as being unpatentable over Pope, USP 6,655,845 in view of Morway, USP 3,196,109.

Pope discloses a low-friction sliding mechanism wherein:

- the DLC coated sliding member (races in Figures 2H-1, 2H-2 and 2K-1) is formed by coating diamond-like carbon on a base material (polycrystalline diamond, PDC);
- the sliding member (roller in Figure 2K-1) is formed with at least one kind of material selected from a group consisting of a metal material, a non-metal material and a coated material obtained by coating a thin film on a surface of the metal material or the non-metal material (roller is coated with PDC, clm 2)

Pope does not disclose the use of a low-friction agent composition that comprises an ester, the ester comprising at least one kind selected from the group

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consisting of glycerin monooleate, glycerin dioleate, sorbitan monooleate and sorbitan dioleate, the ester being contained in the range of 0.05 to 3.0% relative to the total mass amount of low-friction agent composition.

Morway teaches a low-friction agent composition (lubricant) that that comprises an ester, the ester being sorbitan monooleate (see column 3 lines 17-24) and the ester contained in the range of 0.05 to 3.0% relative to the total mass amount of low-friction agent composition (see column 3 lines 17-24, additives are contained in a 0.1-10% range) for the purpose of inhibiting corrosion (sorbitan monooleate is a known corrosion inhibitor, see column 3 lines 17-24).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Pope and provide a low-friction agent composition that comprises an ester, the ester comprising at least one kind selected from the group consisting of glycerin monooleate, glycerin dioleate, sorbitan monooleate and sorbitan dioleate, the ester being contained in the range of 0.05 to 3.0% relative to the total mass amount of low-friction agent composition, as taught by Morway, for the purpose of providing a lubricant with corrosion inhibiting properties.

Response to Arguments

Applicant's arguments, see Remarks, filed December 30, 2010, with respect to the rejection based on Pope in view of Buckley have been fully considered and are persuasive. The rejection using Pope in view of Buckley has been withdrawn.

Applicant's arguments filed December 30, 2010 with respect to Pope in view of Rubin have been fully considered but they are not persuasive.

Applicant argues that Pope and Rubin teach separately using a DLC coating and an oxygen-containing organic compound contained in lubricating oil and do not teach using the lubricant in combination with a DLC coating and a skilled artisan would require the knowledge of the mechanism that allows a low-friction agent with the organic compound to interact with the DLC coating, and this knowledge was not available to the skilled artisan until it was discovered by the Applicant.

Pope discloses that bearing elements can be provided with a DLC coating and Rubin discloses a lubricant having an organic compound which is used on sliding surfaces. Applicant has not developed the DLC coating or the lubricant, both of these features were known at the time of filing by Applicant. Since both components were known at the time of filing the question is not if a skilled artisan processed the knowledge of the result of combining the two but whether or not a skilled artisan processes the ability to combine the two. Using lubricant in bearings was also known at the time of filing and one of ordinary skill processes the ability of combining the bearing of Pope with any known stock lubricant, the resulting properties of the bearing with any lubricant would be a modification to the friction between the members. One of ordinary skill in the art does indeed process the ability and knowledge to select any lubricant for a bearing based on friction reduction, corrosion resistance or thermal properties of the environment of use for the bearing. The degree of friction modification which Applicant

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has measured in the combination of a DLC coating with an oxygen containing element is not in itself an invention.

Applicant further argues (second and fourth points) that the invention can not be realized under conventional lubrication theory and the findings are unexpected, and the combination used in transmission and other gear units reduces friction and wear to improve fuel economy.

First, the recitation of the environment in which the bearing is used is an intended use limitation; however, Rubin does disclose that the lubricant is for automobile components. The bearing disclosed by the combination of Pope in view of Rubin can be used in any mechanical device to support rotary motion. Second, to support the position of unexpected results Applicant relies on the newly cited document from Kano. However, this document does not address the claims of the instant applicant; in fact the documents primary concern appears to be selecting the proper DLC coating and not the lubricant which the instant application is concerned. The document also does not disclose what was expected when using the DLC with the claimed lubrication as would be explained by conventional lubrication theory and how the results were different from the expected. Finally, evidence of unexpected results should be submitted in an affidavit and should clearly state what the lubricant of the claimed invention was expected to do and then show how the result was different from what was expected.

Applicant's third argument focuses on how the reaction of the lubricant and the sliding members creates a film that covers the members which is the result of hydrogen bonding in alcohols.

The above combination meets the limitations of the lubricant required by the claim. When combined the lubricant of Rubin would create a film on the sliding components regardless of the hydrogen bonding. If Applicant has discovered that it is the hydrogen bond with the DLC coating that is producing the "unexpected results" evidence of this should be submitted in the form of an affidavit. Applicant goes on to further state that when alcohols are not used, which are the alternatives in the claim, the other components will undergo cutting to form an OH group and after this happens it becomes the same as alcohols but the claim does not require any cutting of the alternatives that do not require alcohol.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to JAMES PILKINGTON whose telephone number is (571)272-5052. The examiner can normally be reached on Monday - Friday 7-3.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Richard Ridley can be reached on (571)272-6917. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/JAMES PILKINGTON/
Examiner, Art Unit 3656
1/20/11